

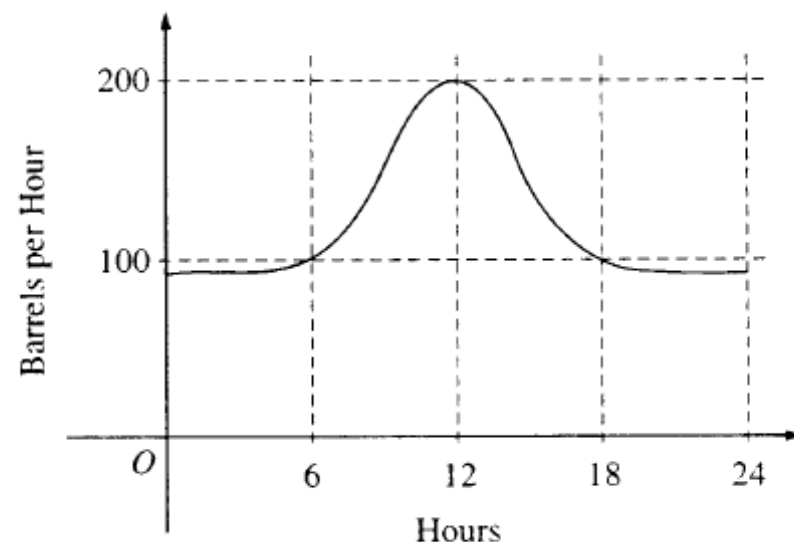
2. The graph of a piecewise-linear function  $f$ , for  $-1 \leq x \leq 4$ , is shown above. What is the value of  $\int_{-1}^4 f(x) dx$ ?

(A) 1                      (B) 2.5                      (C) 4                      (D) 5.5                      (E) 8

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5.  $\int_0^x \sin t \, dt =$

(A)  $\sin x$                       (B)  $-\cos x$                       (C)  $\cos x$                       (D)  $\cos x - 1$                       (E)  $1 - \cos x$



9. The flow of oil, in barrels per hour, through a pipeline on July 9 is given by the graph shown above. Of the following, which best approximates the total number of barrels of oil that passed through the pipeline that day?

(A) 500                      (B) 600                      (C) 2,400                      (D) 3,000                      (E) 4,800

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15. If  $F(x) = \int_0^x \sqrt{t^3 + 1} \, dt$ , then  $F'(2) =$

(A) -3                      (B) -2                      (C) 2                      (D) 3                      (E) 18

20. What are all values of  $k$  for which  $\int_{-3}^k x^2 dx = 0$ ?

- (A)  $-3$                       (B)  $0$                       (C)  $3$                       (D)  $-3$  and  $3$                       (E)  $-3, 0$ , and  $3$
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27. What is the average value of  $y = x^2\sqrt{x^3 + 1}$  on the interval  $[0, 2]$ ?

- (A)  $\frac{26}{9}$                       (B)  $\frac{52}{9}$                       (C)  $\frac{26}{3}$                       (D)  $\frac{52}{3}$                       (E)  $24$
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82. If  $f$  is a continuous function and if  $F'(x) = f(x)$  for all real numbers  $x$ , then  $\int_1^3 f(2x) dx =$

- (A)  $2F(3) - 2F(1)$   
(B)  $\frac{1}{2}F(3) - \frac{1}{2}F(1)$   
(C)  $2F(6) - 2F(2)$   
(D)  $F(6) - F(2)$   
(E)  $\frac{1}{2}F(6) - \frac{1}{2}F(2)$

$x$	2	5	7	8
$f(x)$	10	30	40	20

85. The function  $f$  is continuous on the closed interval  $[2, 8]$  and has values that are given in the table above. Using the subintervals  $[2, 5]$ ,  $[5, 7]$ , and  $[7, 8]$ , what is the trapezoidal approximation of

$$\int_2^8 f(x) dx?$$

- (A) 110                      (B) 130                      (C) 160                      (D) 190                      (E) 210
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92. If  $0 \leq k < \frac{\pi}{2}$  and the area under the curve  $y = \cos x$  from  $x = k$  to  $x = \frac{\pi}{2}$  is 0.1, then  $k =$

- (A) 1.471                      (B) 1.414                      (C) 1.277                      (D) 1.120                      (E) 0.436